REMARKS

This is intended as a full and complete response to the Office Action dated September 28, 2007, having a shortened statutory period for response set to expire on December 28, 2007. Please reconsider the claims pending in the application for at least the reasons discussed below.

Claims 1-31 remain pending in the application upon entry of this Response. Claims 32-41 have been cancelled without prejudice by the Applicants, and may be pursued in a continuing application. Claims 1-31 stand rejected by the Examiner. Reconsideration of the rejected claims is requested for at least the reasons presented below.

Election/Restriction

Restriction to one of the following inventions is required by the Examiner under 35 U.S.C. § 121:

I. Claims 1-31 are drawn to apparatuses, classified in class 118, subclass 715.

II. Claims 32-41 are drawn to a method, classified in class 427, subclass 248.1.

The Applicants affirm election of Group 1, claims 1-31, with traverse. Claim 24 has been amended to correspond to an apparatus, as claimed by the claims in Group I.

Claim Objections

Claim 7 stands objected to because of a typographical informality. Claim 7 has been amended to acquiesce with the Examiner's objection.

Claim Rejections – 35 U.S.C. § 112

Claims 4, 7, and 18 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 4, 7, and 18 have been amended to clarify the invention.

Withdrawal of the rejection is respectfully requested by the Applicants.

Claim Rejections – 35 U.S.C. § 103

Claims 1, 3-11, 13-23, and 25-31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Iseki et al.* (U.S. Pat. No. 6,174,371, hereafter *Iseki*) further in view of *Ono* (U.S. Pat. No. 5,372,754, hereafter *Ono*). The Applicants respectfully traverse the rejection on grounds that the references, alone or in combination, fail to teach, show, suggest, or otherwise render obvious the claimed subject matter.

Iseki discloses an apparatus for heating a substrate in a stable atmosphere, without permitting the vapor of a treating liquid to condense on the substrate (Abstract). In this apparatus, a carrier gas at a constant rate is bubbled through a tank of a treating liquid (Column 7, Lines 36-44; Figure 2) and combined with a diluting gas at mixer **38** (Figure 2). The main controller controls the flow of the control valve **39**, adjusting the flow of the diluting gas so that the vapor of the treating liquid in the mixture has a partial pressure which increases with time (Column 9, Lines 8-13).

Additionally, *Iseki* discloses the vapor pressure, and therefore flow of the diluting gas, is directly proportional to the height of the substrate within the process chamber. This is accomplished by progressively lowering the substrate located in the process chamber further from the vapor inlet at the top of the chamber as the treating vapor is introduced (Column 5, Lines 48-54). As the substrate is lowered closer to a heater, the partial pressure adjusting device **39** adjusts the inlet partial pressure of the treating liquid in the vapor, according to the downward displacement of the substrate (Column 5, Lines 54-65). That is, as the substrate is lowered towards the heater, the wafer temperature and gas flow are increased, which increase the vapor pressure within the chamber (Column 9, Line 13 – 26).

Furthermore, the flow of the carrier gas is not controlled by an independent valve. Rather, the flow of the diluting gas is controlled by a valve **39** and the flow of the combined process gas is controlled by valve **41**. However, the sole flow of the carrier gas is not adapted to be controlled by a single dedicated valve.

Ono teaches a method in which a carrier gas **4** is forced into a liquid feedstock **L** to turn the feedstock into a mist (Abstract). This carrier gas is then passed through a liquid mass flow controller **LC** (Column 4, Lines 44-48). The mass flow meter measures the mass of the liquid in the carrier gas (Column 4, Lines 52-58). The mist is then vaporized (Column 4, Lines 60-63).

The Applicants respectfully submit that the apparatus of *Ono* is incapable of generating a signal indicative of a concentration of the precursor in the process gas. The mass flow meter is only capable of measuring the liquid mass of a mist. Concentration could then be calculated based on the carrier gas flow, as described in Column 1, Lines 50-66, but with error when using a lower mass of precursor (Column 2, Lines 3-9). This error is further increased by the addition of the carrier gas through valve **5b**, after the mass has previously been measured (Column 5, Lines 45-48). Additionally, the mass flow meter does not measure the process gas. Instead, it measures the mist from tank **T**, which is then combined with gas flowing from valve **5b** and additionally vaporized to form the process gas.

Furthermore, *Ono* does not have valves **5a** and **5b** for regulating the flow of the process gas, and therefore the concentration of the precursor in the process gas. Rather, a control valve is located within the liquid mass flow controller, which controls the amount of misted feedstock passing through the controller (Column 4, Lines 52 – 58).

Therefore, the Applicants respectfully submit that *Iseki* and *Ono*, alone or in combination, do not teach, show, suggest, or otherwise render obvious a first valve adapted to regulate a first carrier gas flowing into the vessel, whereby the first carrier gas is combined with the precursor, a gas analyzer having an ultrasonic transducer or a mass flow meter adapted to generate a signal indicative of a concentration of the precursor in the process gas, and a controller configured to calculate a mass flow rate

of the precursor based on the signal, as recited in claim 1, and claims dependent thereon.

Also, the Applicants respectfully submit that *Iseki* and *Ono*, alone or in combination, do not teach, show, suggest, or otherwise render obvious a precursor monitoring apparatus disposed between the process chamber and the vessel, wherein the precursor monitoring apparatus has a gas analyzer to generate a signal indicative of a concentration of the precursor in the process gas or the signal is indicative of the flow rate of the precursor, and an integral controller to receive the signal, as recited in claim 11, and claims dependent thereon.

Also, the Applicants respectfully submit that *Iseki* and *Ono*, alone or in combination, do not teach, show, suggest, or otherwise render obvious a first valve to regulate a first carrier gas flowing through an input into the vessel, a gas analyzer to generate a signal indicative of a concentration of the precursor in the process gas or indicative of a process flow rate, and a controller to receive the signal and is configured to maintain the concentration of the precursor and the volume flow rate of the process gas constant by adjusting the first valve and the second valve, as recited in claim 23, and claims dependent thereon.

Withdrawal of the rejection to claims 1, 3-11, 13-23, and 25-31 is respectfully requested by the Applicants.

Claims 2, 12, and 24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Iseki* and *Ono*, further in view of *Renken et al.* (U.S. Pat. No. 4,685,331, hereafter *Renken*). The Applicants traverse the rejection on grounds that claims 2, 12, and 24 depend from claims 1, 11, and 23, respectively. Claims 1, 11, and 23 are believed to be allowable, so claims dependent thereon should be allowable as well. *Iseki* and *Ono* are discussed and distinguished above.

Renken does not cure the deficiencies of *Iseki* and *Ono*. *Renken* describes a mass flow controller which controls the flow of a single process stream through a single valve. *Renken* is void of any teachings for pulsing a gas into a process chamber.

Therefore, the Applicants respectfully submit that *Iseki, Ono*, and *Renken*, alone or in combination, do not teach, show, suggest, or otherwise render obvious a first valve adapted to regulate a first carrier gas flowing into the vessel, whereby the first carrier

gas is combined with the precursor, a gas analyzer having an ultrasonic transducer or a mass flow meter adapted to generate a signal indicative of a concentration of the precursor in the process gas, and a controller configured to calculate a mass flow rate of the precursor based on the signal, as recited in claim 1, and claims dependent thereon.

Also, the Applicants respectfully submit that *Iseki*, *Ono*, and *Renken*, alone or in combination, do not teach, show, suggest, or otherwise render obvious a precursor monitoring apparatus disposed between the process chamber and the vessel, wherein the precursor monitoring apparatus has a gas analyzer to generate a signal indicative of a concentration of the precursor in the process gas or the signal is indicative of the flow rate of the precursor, and an integral controller to receive the signal, as recited in claim 11, and claims dependent thereon.

Also, the Applicants respectfully submit that *Iseki*, *Ono*, and *Renken*, alone or in combination, do not teach, show, suggest, or otherwise render obvious a first valve to regulate a first carrier gas flowing through an input into the vessel, a gas analyzer to generate a signal indicative of a concentration of the precursor in the process gas or indicative of a process flow rate, and a controller to receive the signal and is configured to maintain the concentration of the precursor and the volume flow rate of the process gas constant by adjusting the first valve and the second valve, as recited in claim 23, and claims dependent thereon.

The Applicants submit that claims 1, 11, and 23 are believed to be allowable. Therefore, claims 2, 12, and 24, which depend from claims 1, 11, and 23, should be allowable as well.

Withdrawal of the rejection is respectfully requested by the Applicants.

Double Patenting

Claims 1-31 stand rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-14 and 24-35 of U.S. Patent No. 6,772,072 in view of '371.

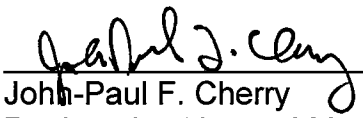
The Applicants have submitted a terminal disclaimer in compliance with 37 C.F.R. 1.321(c) to overcome the nonstatutory obviousness-type double patenting rejections.

Withdrawal of the rejections is respectfully requested by the Applicants.

In conclusion, the references cited by the Examiner, alone or in combination, do not teach, show, suggest, or otherwise render obvious the claimed invention.

Having addressed all issues set out in the Office Action, the Applicants respectfully submits that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



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